

TABLE VIII-continued

12 MONTH FLORIDA EXPOSURE (20° BLACK BOX)			
Sample Description	Initial Gloss (20° Meter)	Gloss After One Year Florida	Gloss Retention (%)
Production Material			

The production enamel and lacquer coupons, respectively, retained only about 71.6 and 64.8 percent of their initial measured gloss. The average gloss retention of the subject topcoats with piperidinol stabilizer reacted into the urethane backbone on the average retained about 89.0 percent of their original gloss.

In summary, we have developed a novel coating composition and a method of making it. We have reacted a hindered piperidine U.V. stabilizer into the resin with stable urethane bonds. Simply mixing the constituents together does not yield an acceptable paint. Rather, our method of first reacting the piperidinol stabilizer with a suitable isocyanate and thereafter reacting in a chemical excess of polyol should be followed.

As may be deduced from the Examples, we prefer to incorporate (on a chemical equivalents basis) about 0.1 to 0.5 equivalents of monohydroxy hindered piperidine per equivalent polyisocyanate and about 1.4 to 5.0 times the total isocyanate equivalents polyether polyol.

To the best of our knowledge, ours are the only known U.V. stabilized urethane paints that can be cured at low temperatures within a reasonable time by an acid catalyzed melamine crosslinking reaction. The relatively low viscosities of the binder resins allows high solids contents in the coatings.

While our invention has been described in terms of specific embodiments thereof, clearly, other forms may be readily adapted by one skilled in the art. Accordingly, our invention is to be limited only by the following claims.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A sprayable high solids coating composition which produces a durable, high gloss surface finish when applied to and cured over a suitable substrate, said composition comprising a urethane binder resin which is the reaction product of (1) aliphatic polyisocyanate, a portion of said isocyanate having hindered piperidine end groups and (2) a stoichiometric excess with respect to the polyisocyanate of polyether polyols, said coating being cured by crosslinking said urethane binder resin by means of an acid catalyzed melamine crosslinking agent, the cured coating having hindered piperidine groups chemically incorporated therein to inhibit loss of coating gloss by exposure to ultraviolet radiation.

2. A resin for a high gloss urethane coating composition suitable for outdoor applications comprising the reaction product of a first constituent formed by reacting on a chemical equivalents basis about 0.1 to 0.5 chemical equivalents of monohydroxyl piperidinol per equivalent of polyfunctional aliphatic isocyanate to form piperidine group terminated isocyanate prepolymer and a second constituent consisting essentially of chemically equivalent amounts of polyether diol and polyether triol, the sum of the equivalents of the diol and triol being in the range of from about 1.4 to 5.0 times the chemical equivalents of said isocyanate in said prepolymer, said reaction product being characterized by its capacity to form a high gloss coating that is resistant to loss of gloss from exposure to ultraviolet radiation,

said resistance being provided by the piperidinol constituent which is chemically incorporated into the coating by urethane bonds which are chemically stable with respect to an acid catalyzed melamine cure of the resin in the formation of a said coating.

3. A sprayable urethane coating composition comprising at least about 50 weight percent non-volatile constituents which composition produces an impact resistant and U.V. stable high gloss coating when applied to and cured over a suitable substrate, the composition comprising a urethane resin which is the reaction product of a first constituent comprising a piperidine terminated isocyanate prepolymer which is the reaction product of about 0.1 to 0.5 chemical equivalents of monohydroxyl piperidinol per equivalent of polyfunctional aliphatic isocyanate and a second constituent consisting essentially of chemically equivalent amounts of polyether diol and polyether triol, the sum of the equivalents of the polyols being in range of from about 1.4 to 5.0 times the total equivalents of isocyanate, the resultant urethane resin thus having unreacted hydroxyl groups; and added to said resin an amount of partially methylolated melamine sufficient to cure said coating composition by crosslinking the resin at said unreacted hydroxyl groups when the composition is heated to a suitable elevated temperature, said cure being accelerated by a catalytic amount of a weak acid compatible with the coating composition, the incorporation of said piperidinol in the cured coating providing it with resistance to loss of gloss due to exposure to ultraviolet radiation.

4. A heat curable high gloss urethane coating composition that is suitable for automotive topcoat applications due to its gloss stability upon extended exposure to ultraviolet radiation the non-volatile portion of said composition comprising on a weight basis 100 parts methylene bis(4-cyclohexyl isocyanate) prereacted with from about 10-30 parts 2,2,6,6-tetramethyl-4-piperidinol ultraviolet stabilizer; from about 100-250 parts of polyether diol having an average molecular weight of about 300-1500 grams per mole and from about 50-150 parts polyether triol having an average molecular weight of about 300-2500 grams per mole to provide flexibility to said coating; from about 350-450 parts trimethylolated melamine crosslinking agent; and of pyrophosphoric acid sufficient to accelerate said crosslinking agent; wherein said composition the piperidinol constituent is reacted into the coating by means of a stable urethane linkages to the isocyanate constituent thereof which piperidine substantially inhibits gloss deterioration of a cured coating due to exposure to ultraviolet radiation.

5. A method of making a low viscosity, high solids urethane resin which forms a durable, UV-stable, high gloss coating when applied to a suitable substrate and heated in the presence of an acid catalyzed melamine crosslinking agent, the method comprising reacting a hindered piperidinol constituent with a stoichiometric excess of polyisocyanate to form an isocyanate prepolymer having hindered piperidine end groups, said piperidine and polyisocyanate constituents being joined by urethane linkages; and thereafter reacting said isocyanate prepolymer with a stoichiometric excess of polyether polyols to form a said coating resin having functional hydroxyl groups whereat the resin can be crosslinked by the said melamine crosslinking agent,